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ABSTRACT

Delayed language development is compared to normal development along six basic parameters, and the problem of language delay among handicapped children is addressed. Interaction characteristics that occur at an early stage between the mother and handicapped child are also reviewed, along with the way parents tend to compensate for their child's language learning impairments. In addition, the research on the mother-child interaction is summarized, and basic implications for future research and remediation efforts are outlined. The six parameters of language development are as follows: (1) pragmatic development; (2) attention, discrimination, and cognitive development; (3) vocabulary; (4) syntactic and semantic development; (5) peer interaction; and (6) rate and frequency of use. It is concluded that interventions designed to compensate for the dysfunctional nature of early dyadic interaction may have significant remedial potential. It is suggested that if dysfunctional aspects of interactions between handicapped children and their caregivers can be identified, then therapeutic changes might be made early in the parent-child relationship to facilitate communication development. Attention is also directed to the finding that normal and delayed infants behave similarly until about 12 months, after which lower functioning children show less differentiation between their mothers' vocalizing and not vocalizing than the higher functioning children. A list of approximately 45 references is appended. (SEW)

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Language Acquisition Patterns in Normal and Handicapped Children

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Language has been defined many times, in many different ways. One of the most useful definitions was offered by Ervin-Tripp (1971) in the context of describing what is involved in language learning: language is saying the right things, at the right time, in the right way. "Right things" are the child's intentions—what is being requested, described, asked about, or pointed to in the communication episode. "Right time" corresponds with the social context of communication and includes taking turns, recruiting the listener's attention, and saying things that are appropriate to the particular context. Most language research has focused on the "right way" by analyzing the structure of language and the vocabulary children use.

Learning language is more than just learning a code for meanings and a system for ordering words into sentences. Children learn how and when to use language in the context of social interactions. Children acquire language because it is functional for them: language mediates the behavior of others. For language to be functional, there must be listeners who respond to children's communication attempts. Thus, social interactions between children and their caretakers are the essential social milieu for language learning, and social interaction skills are prerequisite for language.

Language acquisition represents both a process and outcome in children's learning. The first spoken words are a milestone in the process of developing communication intention and a means for expressing it. Normal infants in the first weeks of life begin to acquire communication skills by discriminating voices from other sounds, and their mother's face and voice from those of other people. Communicative behavior emerges as soon as children begin to establish eye contact with caregivers and quickly progresses to

verbal and nonverbal turntaking, as seen in sequential vocalizations and exchanges of objects between mothers and their six-month olds. Early sound play (babbling) alone or in turns with an adult, and the use of gestures to indicate attention or desires, are also precursors to the first words. There is laboratory evidence to indicate that young children begin to "understand" meanings long before they express them. Certainly most mothers are confident that a similar process occurs in everyday contexts. Thus, while first words are a milestone, they are embedded in a long process involving discrimination of various aspects of the verbal and nonverbal environments and expression of attention and intention through a variety of vocal and nonvocal means.

Communication skills are such a critical part of development that it is not surprising that much attention has been directed toward understanding what comprises language and communication and how these skills emerge. Most research has focused on documenting the characteristics of language development in normal children. However, a number of descriptive and experimental intervention studies have resulted in the documentation of many of the specific characteristics of delayed language development. But because of the heterogeneity of handicapped children, it is sometimes difficult to generalize from findings for a specific population (e.g., Down's syndrome children) to all handicapped children.

The language delays in handicapped children emanate from two sources. The first source is usually a structural or biological disability which impairs the child's basic learning abilities. This disability retards and distorts learning. The second source is the inability of people managing the child's environment, parents, teachers, and peers, to alter their

behavior to compensate for these learning deficits. While acknowledging the effects of structural and biological impairments, this paper will nevertheless concentrate on the effects of the second source—the inability of the child's environment to adjust sufficiently to compensate for his impairments.

The purpose of this paper is threefold: First, a review of what is known about delayed language development compared to normal development along six basic parameters will provide the reader with a general understanding of the multi-faceted nature of language acquisition, and thereby of language delay. Second, a review of what is known about early mother-handicapped child interaction points out how parents tend to compensate for their child's language learning impairments. Finally, the mother-child research is summarized and basic implications for future research and remediation efforts are outlined. The overall goal of the paper is to provide the reader with a general context for approaching the problem of language delay among handicapped children.

Parameters of Language Development

Six parameters of language development are discussed. These include: 1) pragmatic development; 2) attention, discrimination and cognitive development; 3) vocabulary; 4) syntactic and semantic development; 5) peer interaction; and 6) rate and frequency of use. There is no particular reason for the order of presentation because, with the possible exception of peer interaction, development along each parameters begins or has its roots in early infancy. Furthermore, the areas interact with and overlap each other. They are distinguished primarily for purposes of the researcher

or therapist, not for the child or his parents. Nevertheless, there is general agreement among scientists that each area represents an important element of the continuous multi-faceted process of language acquisition. To neglect any of these elements would therefore result in a distorted picture of the overall process.

Pragmatic development. Pragmatics refers to the intentions of the speaker, the relations of utterances to contexts, and conversational skills. The roots of pragmatic language development appear to lie in the pattern of interaction established during infancy (Bruner, 1975; Lewis & Rosenblum, 1977). That pattern involves mutual attention, joint action, turntaking, and accomodation between the two participants. From early interactions, children learn to behave responsively (vocally or nonverbally) in the presence of listeners and to cease behaving periodically in order to give the other member of the dyad opportunities to behave. These early pre-linguistic interactional patterns are prototypes for later conversational exchanges.

As children acquire semantic knowledge and then syntax, formal linguistic expressions are added to the early interactional patterns. As a result, by the time normal children are four years old, they typically express a range of communicative intentions that vary according to immediate context. They take into account what information is and is not shared between themselves and their listener, they integrate new information into a conversation, and understand and use rules for cooperative conversational turntaking.

Most developmentally delayed infants have greater difficulty establishing interactional strategies than normal children, perhaps due to attentional deficits (Vietze, Abernathy, Ashe, & Faulstich, 1978). However, most

developmentally delayed children who acquire productive linguistic competence above the 2.0 mean length of utterance level (MLU) also develop all general categories of pragmatic function (e.g., question, request, acknowlege, etc.). Delayed children may utilize these functions less frequently than normal children and may be less able to adapt their speech to the needs of their listener (Bryan, Wheeler, Felcan, & Henek, 1976). They also may exhibit marked deficiencies in the presuppositional use of linguistic terms, utilize fewer informative elements in their speech, and use both declarative and imperative pragmatic forms less than normal children (Snyder, 1978). Other research has shown that language delayed children have a more limited range of specific communicative intentions and use these intentions less frequently than normal children. They are often deficient in acquiring the elemental components of conversational turn-taking (Vietze et al., 1978), and they participate less than normal children in verbal and nonverbal exchanges with caretakers (Schiefelbusch, 1981).

Attention, discrimination and cognitive development. From the first days of life, infants attend to and discriminate among the various aspects of their visual and auditory environments. Newborns detect small variations in acoustic phenomenon which are critical to language and communication (cf. Leventhal & Lipsitt, 1964; Stratton & Connolly, 1973). Within a few weeks, they discriminate the characteristics of their mothers' voices (cf. Mills & Melhuish, 1964). By four months of age, infants distinguish among many sights and sounds and begin to perceive the relationships between events in the two modalities (Spelke, 1976).

Development of attentional and discrimination skills appears to follow the same sequences in normal and handicapped children; however, handicapped

children show consistent delays in acquiring these processes. These delays, in turn, result in delays in developing language and communication skills. Severely language delayed children have been reported to show no preference for normal speech sounds over white-noise soundtracks (Friedlander, Wetstone, & McPeek, 1974). Down's children at 6 and 12 months of age do not habituate to sounds in the same way that normal children at the same ages typically do (Garnet, Ohlrich, & Shanks, 1971). Similarly, Down's syndrome children seem to have greater difficulty acquiring visual discriminations that may be related to communication. Deficits in attention patterns (cf. Fisher & Zeaman, 1973), iconic memory (cf. Galbraith & Gliddon, 1972), and short-term memory (Mosley, 1980) are commonly observed in handicapped children.

Increasingly, research with normal infants suggests that attentional and discrimination skills are acquired and used in early infancy and that these skills are the basis for receptive language learning. Research with handicapped children suggests that deficits in these critical processes are common. These deficits contribute substantially to subsequent delays in language development.

Most infants also acquire a sequence of cognitive skills described by Piaget's (1963) six stages of sensorimotor development before they begin using words. Retarded infants follow a similar pattern of development. However, they complete the progression of skills at a much slower rate and, perhaps, do not acquire the breadth of skills normal children do (Ryan, 1975). Sensorimotor skills may be necessary, but not sufficient, for language. Some handicapped children acquire all the basic stages of sensorimotor function, but do not engage in linguistic behavior (Kahn, 1975; Woodward & Stern, 1963). Down's syndrome children in particular often

show language development that is more delayed than would be suggested by their general levels of intellectual and social functioning (Mahoney, Glover, & Finger, 1981). Additional language delays suggest that other abilities, particularly vocal imitation, may be necessary for the acquisition of verbal language.

Vocabulary. The acquisition of words is a milestone marking the transition from prelinguistic to linguistic communication. The acquisition of reference terms for objects, actions, states, locations, and so forth correspond directly to children's cognitive maps of the world. Vocabulary acquisition provides children a means for understanding the verbal behaviors of others. A growing vocabulary also provides an increasingly efficient means for making needs known. The acquisition of vocabulary is primarily a process of association and categorization. Since these processes themselves are so basic to cognitive development, vocabulary size has been used as an index of general intellectual functioning in children (Hunt, 1961).

In developmentally delayed children, vocabulary size and rate of growth correlates with degree and type of disability (Bankson, 1978). The order of acquisition tends to proceed from referents to action words, to modifiers and function words in both atypical and normal children. Labeling strategies used by developmentally delayed children acquiring their first words appear to be remarkedly similar to those of normal children (Leonard, Cole, & Steckol, 1979). However, specific delays in vocal imitation skills may retard vocabulary acquisition to an even greater extent than indicated by children's general developmental level (Mahoney, Glover, & Finger, 1981).

Semantics and syntax. "Semantics" refers to the acquisition of the underlying relational meanings expressed within linguistic communications.

For example, in the sentence "He kicks the ball," an agent-action-object relationship is expressed. The agent (he) acts (kicks) on the object (the ball). There is evidence that children begin to acquire basic relational knowledge soon after birth, by observing how the world works (e.g., how agents act upon objects) and by acting on the world themselves and, thus, learning the basic laws of cause and effect. As the child begins to acquire referents for objects, actions, attributes, and so forth, syntax becomes possible.

Syntax is the process of combining words into meaningful sentences following categorical ordering rules. Acquiring syntax is learning the code for translating semantic relations into culturally meaningful statements. It requires learning acceptable combinations of nouns, verbs, prepositions, articles, adverbs, as well as how to correctly pluralize, use tenses, etc. Children's productive knowledge of syntax is observed by analyzing the structure of the sentences they use. Knowledge of semantic relations is typically inferred from language samples enriched with contextual notes or assessed using formal tests. Beginning at about 18-24 months, the process of language acquisition becomes one of acquiring syntactic structures and learning to integrate additional vocabulary into these structures. Syntactic development is usually complete by the time the child reaches seven.

Most handicapped children acquire basic semantic categories and syntax in the same developmental sequence as normal children, but at a relatively slower rate (Miller & Yoder, 1974). Many severely retarded children never develop a generative syntactic system. Two explanations for this failure have been explored. Studies have shown that children who never attain

sensorimotor stage 6 (Piaget, 1963) in which children acquire an abstract symbol system of some sort whereby symbols can be used by them to stand for things, also never develop a generative syntactic system (Miller & Yoder, 1974). However, an alternative possibility is that children who have failed to acquire syntax suffer from auditory or visual processing distortions. Such distortions make productive vocal language extremely difficult but can be countered by using other modes of communication, such as signing or communication boards. Many severely handicapped children have been taught generative syntax systems using alternative production modes.

Even when handicapped children have linguistic systems similar to those of normal children, they generally are not able to use their system with the same degree of efficiency (Morehead & Ingram, 1976). Handicapped children rarely use linguistic forms as frequently as normal children do (Layton & Sharifi, 1979). There are also specific etiological characteristics which may partly account for retarded syntactic development. For example, Down's syndrome children tend to have specific difficulties with auditory abilities (Rohr & Burr, 1978). Autistic, as well as mildly retarded and learning disabled children, exhibit problems related to stimulus overselectivity, which make appropriate syntactic discriminations especially difficult (Bailey, 1981).

Peer interaction. Peer interaction gradually increases among normal children and accelerates when children begin to develop peer friendships between the ages of four and six. Peer interaction is important to normal development because it allows children to learn from each other and to experience different basic social roles and routines as a precursor to more sophisticated social relations later on. Peer interaction among young,

developmentally delayed children and with normal children is typically infrequent. Often, verbal interactions are restricted to protests and demands (Paul, in press). Normal children adjust the level and complexity of their speech to facilitate successful communication with handicapped peers (Guralnick & Paul-Brown, 1980), but they still prefer to talk with other normal children and will avoid developmentally delayed peers in a mainstreamed classroom situation (Cavallaro & Porter, 1980).

Rate and frequency of use. Sufficient rates of interaction and language use are implicit in successful language acquisition. An appropriate rate of interaction with the environment is important almost from birth. Normally developing children interact frequently with persons and objects in the environment by means of visual tracking, fixation, and object manipulation. Normal infants also exhibit a high rate of self-directed and joint activity.

Appropriate rate is to implicit to language development that it is frequently overlooked. Rate may be the most important single variable effecting appropriate use. Nelson (1973) reports that "verbalizing a lot" is a strategy that is positively related to all aspects of learning to talk. Hart and Risley (1980) found that when the practice of language increased, the frequency of adding new items to the lexicon and of producing complex sentence structures also increased. Children who have the habit of using language as a response class in the presence of objects and actions, and whenever they encounter a stimulus change, are laying the ground on which the component syntactic and semantic classes can be built (Hart, 1980). A high rate of use provides many practice opportunities and gives adults sufficient opportunities for shaping and expanding children's repertoires.

Infrequent use of language is a characteristic of language delay and one of its contributing factors. Depressed usage rates by handicapped children are associated with each of the developmental dimensions discussed previously. By the time handicapped children reach preschool, low rates have contributed significantly to their delays. They differ markedly from their normal peers. Language delayed children talk about half as much as their normal peers and are approximately half as responsive to inquiries from teachers and peers (McQuarter, Rogers-Warren, & Warren, 1979).

Summary. This very selective review provides a broad picture of the characteristics of language delay. It suggests implicitly how seldom a delay in language development may be due to a single dysfunctional component. Instead, it is apparent that all parameters of the process are closely related: a delay or deficiency in one is likely to cause delays and deficiencies in the others, at least to some extent. How language delays are manifested depend on the general disorder of the child (i.e., Down's syndrome, autism, etc.) and its characteristics, in combination with the effects of the child's environment over time. Therefore, we will now briefly review what is known about early parent-handicapped child interaction.

Dyadic Interaction

Most communication skills are learned in the context of the parent-child dyad during the first years of life (Moerk, 1977). The handicapped child's disabilities may alter these early interactions in ways that further impede the learning process. If dysfunctional aspects of interactions between handicapped children and their caregivers can be identified, then therapeutic changes might be made early in the parent-child relationship to facilitate communication development.

The dyadic interactions between language-learning children and their mothers are the result of patterns established in infancy. Vietze et al. (1978) have offered evidence that at least some part of the typical reciprocal vocal patterns of mothers and infants may be disrupted in the case of developmentally delayed infants. Although normal and delayed infants behaved quite similarly until about 12 months of age, thereafter, lower-functioning developmentally delayed children show less differentiation between their mothers' vocalizing and not vocalizing than the higher-functioning children. Since the mothers in the two groups did not appear to differ, the children's patterns were assumed to be responsible for the increasingly atypical pattern of interaction between mothers and children.

Several studies have measured other variables in mothers' language that might affect language-learning interactions. Marshall, Hegrenes, and Goldstein (1973) analyzed the verbalizations of mothers to normal and handicapped children, using Skinner's (1957) classification of verbal operants: mands, tacts, and intraverbal and echoic responses. Mothers of retarded children used more mands (requests for behavior) than normal mothers; mothers of normal children used more tacts (descriptive statements) and made greater use of verbal operants. Kogan, Wimberger, and Bobbitt (1969) also reported that giving specific orders occurred much more frequently in mothers of retarded children, and that the most frequent verbal interactions in mothers of normal children were statements of agreement or acknowledgement of their children's activities, and statements of their own thoughts and ideas. These interactions were ranked sixth and seventh for mothers of retarded children, but first and second for normal mothers.

Terdal, Jackson, and Garner (1976), and Rondal (1978) offer plausible explanations of stylistic differences between mothers with normal children and those with handicapped children. Lowered responsiveness has been observed in many studies comparing normal and retarded children. Possibly, lowered responsiveness prompts mothers to increase directiveness and structure in interactions with their children. This seems particularly plausible, since Terdal et al found that responsiveness increased in mental age and correlated with a decrease in mother-directiveness.

Although these studies indicate several significant interactional differences, they must be considered in light of Rondal's (1978) findings that maternal speech to normal and Down's syndrome children did not differ in terms of mothers' mean length of utterance, type-token ratio, or a variety of syntactic, semantic, and pragmatic aspects of language when normal and Down's syndrome children were at similar levels of productive linguistic development. This finding suggests differences in mother-child interaction are based on current linguistic skills of the child rather than other developmental or interactional deficits.

Directions for Future Research

Social interactions between children and their caretakers are the essential milieu for language learning, and social interaction skills are prerequisite for language. Six parameters of language development were discussed here in light of this premise. Developmental delays across these parameters arises from the ineffective (i.e., nonlearning) interaction between an impaired child (cumulatively effected over time) and an environment that does not compensate for the child's deficiencies. Since social interaction is the milieu for language learning, examining early parent-

child interactions and intervening to improve these interactions is critical to a technology for remediating language deficiencies.

The findings of recent mother-handicapped child research provides only a preliminary analysis of interactional variables. These studies raise more questions than they answer. However, findings from these studies support the view that one key to language remediation lies in the thorough understanding of how mothers naturally teach language to their children and how this process becomes dysfunctional with a handicapped child. Several parameters of mother-child interaction merit further research including the contingencies between mother and child behaviors, the effect of differential temporal rates of interaction on language learning, the natural teaching strategies used by mothers, the effects of differential child responsivity and attention, and the effects of specific etiological deficits (e.g., stimulus overselectivity) on mother-child interactions. Currently, one of the most promising general intervention models, milieu language training (e.g., Hart & Rogers-Warren, 1973; MacDonald, in press; Rogers-Warren & Warren, in press) relies on processes similar to those observed in normal mother-child interaction. Additional studies of mothers and their language learning children might provide a more complete list of tactics to be used in parent-based incidental teaching.

Experimental attempts to teach language-deficient children specific interaction strategies should be made. The impact of these interventions should be measured in much the same way that the effects of direct language teaching have been measured: increases in vocabulary and syntax, analysis of rate and directedness of spontaneous speech, generality, and maintenance. Particular attention should be given to parent-based techniques, because

parents typically play the largest role in their children's language acquisition and, thus, may be ideal therapists when remediation is needed.

Summary

An overview of the characteristics of delayed language development has been presented. Research on the bases for delays within early dyadic interaction was briefly reviewed. However, the biological bases for delays were not discussed. Much research remains to be done, particularly in the area of parent-handicapped child interaction, where more questions have been raised than answered. Nevertheless, the research to date suggests that interventions designed to compensate for the dysfunctional nature of early dyadic interaction may have significant remedial potential.

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